Modelling of a Single Currency for Australia and New Zealand

Ariful Hoque, Murdoch University, Australia
Kamrul Hassan, Murdoch University, Australia

Abstract

Since 1 January 1983, Australia (AU) and New Zealand (NZ) have been firmly committed to strong economic relations through reducing the regulatory burden on businesses, increasing competition and encouraging greater economic cooperation. Our study looking beyond 30 years of close economic ties between AU and NZ would be benefited if they go for further integration through a trans-Tasman monetary union. Therefore, we propose a single currency (SINCUR) model based on the AU, NZ and USA monthly inflation adjustment. To examine the validity of the model, the regression analysis is conducted where the SINCUR is regressed on the one month Australian dollar (AUD) and New Zealand dollar (NZD) future spot rate against U.S. dollar (USD). The regression results strongly support the appropriateness of our model to use as single currency for AUD and NZD. It is a simple model and, unlike the single currency Euro, in which a number of factors (long-term interest rate, fiscal deficit and government debt) in addition to nominal inflation are considered. The findings of this study imply that other currencies can use our model for their monetary union if they have a close economic relationship, similar to that of the trans-Tasman union.

1. Introduction

Since the successful implementation of European single currency system, there has been a growing interest in the introduction of similar common currencies in various regional blocks around the globe. The primary driving forces of such initiatives are reduced currency risk, lower transaction costs, greater financial integration and increased trade between the participating economies (Bacha, 2008). Among these benefits, the most obvious and easily measured benefit is the increase in the volume of trade. Empirical studies show that the use of single currency significantly increases the volume of bilateral trade. Rose (2000) finds that bilateral trade between countries having common currency is 200% larger than trade between countries using different currencies. Other studies also found similar results, for example, Flandreau and Maurel (2001) and Lopez-Cordova and Meissner (2003).

Considering the potential benefits of a single currency, the present paper proposes a measure of single currency between Australia and New Zealand. There is strong justification for such a proposal. Australia and New Zealand entered into a trade agreement in 1983 called Australia-New Zealand Closer Economic Relations Trade Agreement (ANZCERTA). The objective of this agreement was to smooth the flows of goods and services between these two countries by removing all kinds of trade restrictions and eliminating the market distortions often created by differing qualitative and quantitative measures. Given the trade enhancing effect of a single currency, the introduction of a single currency will certainly boost bilateral trade between these two island economies, thus helping achieve the goals of the ANZCERTA. Besides, the New Zealand dollar has become more volatile since its float in 1985 and it reacts more strongly to domestic than external shocks (Grimes and Holmes, 2000). A single currency will therefore bring stability to the NZ dollar. Further, a single currency will tie the countries together economically, potentially protecting themselves against the developments in East Asia. In 2011-12, bilateral trade between Australia and New

Zealand was only 3.46 percent of Australia's total trade.[1] A single currency will aid these economies in substantially increasing bilateral trade, which will insulate them from possible adverse economic shocks in the rest of the world.

The study is organized as follows: the next section presents the research methodology and the description of data used in this study, the results and empirical analysis are discussed in Section 3, and the main findings are summarized in Section 4.

2. Methodology and Data

In this section, we develop the methodology for the current study. For the Euro, each member country was expected to meet the following converge criteria (Eiteman et al, 2011):

(a) Nominal inflation should be no more than 1.5% above the average for three members of the European Union (EU) with the lowest inflation rate during the previous year.
(b) Long-term interest rates should be no more than 2% above the average for the three members with the lowest interest rates.
(c) The fiscal deficit should be no more than 3% of the gross domestic product.
(d) Government debt should be no more than 60% of the gross domestic product.

The monetary unification model for the Euro is complicated and not easy to maintain. Recent sovereign debt crises for the Euro zone are a reflection of the complexity of the Euro model. Consequently, we develop a simple single currency (SINCUR) model by adjusting the monthly inflation of Australian dollar (AUD), New Zealand dollar (NZD) and U.S. dollar (USD) as:

$$SINCUR_t = S_t^{AUD/USD} x \frac{(1+INFLATION_t^{AUD})}{(1+INFLATION_t^{USD})} + S_t^{NZD/USD} x \frac{(1+INFLATION_t^{NZD})}{(1+INFLATION_t^{USD})} \ . \quad (1)$$

In Equation 1, $S_t^{AUD/USD}$ and $S_t^{NZD/USD}$ denote the AUD and NZD spot rate, respectively, against the USD. To examine the SINCUR model's validity, the following regression equation is further developed:

$$SINCUR_t = \alpha_0 + \alpha_1 S_{t+1}^{AUD/USD} + \alpha_2 S_{t+1}^{NZD/USD} + \varepsilon_t \ . \quad (2)$$

In Equation 2, $S_{t+1}^{AUD/USD}$ and $S_{t+1}^{NZD/USD}$ represent the one month future spot rate for AUD and NZD, respectively. Jointly, $S_{t+1}^{AUD/USD}$ and $S_{t+1}^{NZD/USD}$ can explain the $SINCUR_t$ accurately if it is appropriate for the proposed single currency model to accommodate AUD, NZD and USD inflation as in Equation 1. It means that under the joint null hypothesis the SINCUR model is valid, and the coefficients α_1 *and* α_2 in Equation 2 should be 1. Further, the $SINCUR_t$ is based on adjusted inflation for two exchange rates (i.e., AUD and NZD exchange rates), and the common currency exchange rate against USD can be obtained as:

$$COMMONFXUSD_t = \frac{SINCUR_t}{2} \quad (3)$$

For the unbiased values of the coefficients α_1 *and* α_2 , Equation 2 is augmented as shown in Equation 4 to accommodate the potential autocorrelation and conditional heteroscedasticity:

[1] Department of Foreign Affairs & Trade, Composition of Trade, Australia, 2011-12 (Released December 2012).

$$SINCUR_t = \alpha_0 + \alpha_1\, S_{t+1}^{AUD/USD} + \alpha_2\, S_{t+1}^{NZD/USD} + \sum_{i=1}^{p} \emptyset_i SINCUR_{t-1} + \sum_{i=1}^{q} \theta \varepsilon_{t-1} + \varepsilon_t \qquad (4)$$

The results of the diagnostic tests and various information criteria will determine the choice of the above lag order, p and q. Further, ε_t in Equation 4 is decomposed in the presence of GARCH (r, s) error by Bollerlev (1986),

$$\varepsilon_t = \mu_t \sqrt{h_t}\,, \qquad \mu_t \sim iid(0,1)$$

$$h_t = \omega + + \sum_{i=1}^{r} \beta_i\, \varepsilon_{t-i}^2 + \sum_{i=1}^{s} \gamma_i\, h_{t-i} + \varepsilon_t\ , \qquad (5)$$

with $\omega > 0, \beta_i \geq 0\ and\ \gamma_i \geq 0$ to ensure $h_t > 0$. Once the presence of the GARCH error is confirmed by the LM test of Bollerslev (1986), the lag order, r and s, will be determined by further diagnostic tests and various information criteria as suggested in Bollerslev (1986).

In this study, the Australian dollar and the New Zealand dollar exchange rates against U.S. dollar and AUD, NZD and USD denominated inflation are used. All sample data have been obtained from the Datastrem database. The sample period from 15/02/1994 to 14/02/1996 are used for $SINCUR_t$, $S_t^{AUD/USD}\, and\, S_t^{NZD/USD}$ in Equation 1. Further, one month ahead $S_{t+1}^{AUD/USD}\, and\, S_{t+1}^{NZD/USD}$ in Equation 2 are obtained from 15/03/1994 to 13/03/1996.

3. Empirical Analysis

We begin the empirical analysis with a discussion of the time series properties of the data used in this study. Table 1 shows the descriptive statistics of the variables. The mean and median values are close for most of the data series. The right skewed distribution (i.e., skewness > 0) of sample data indicates that the most values are concentrated on left of the mean, with extreme values to the right. The kurtosis of SINCUR (i.e., kurtosis > 3) ensures leptokurtic distribution, sharper than a normal distribution, with values concentrated around the mean and thicker tails. Further, the kurtosis of AUDUSD and NZDUSD (i.e., kurtosis < 3) suggest platykurtic distribution, flatter than a normal distribution with a wider peak. Finally, the Jarque-Berra (JB) test results (i.e., P-value = 0) reject the normal distribution for single and NZDUSD sample. The JB statistic rejects the normal distribution for all data series except for AUDUSD (P-value = 0.6347). The overall normal distribution test results for sample data are mixed.

Table 1: Descriptive statistics of variables

Statistical measures	Variables		
	SINCUR	AUDUSD	NZDUSD
Mean	2.951303	1.350251	1.578711
Median	2.931490	1.350800	1.548110
Skewness	0.865609	0.049175	0.669436
Kurtosis	3.122169	2.820772	2.255501
Jarque-Bera (JB)	65.51194 (0.0000)	0.909050 (0.6347)	51.04419 (0.0000)

Notes: The P-value of Jarque-Bera (JB) test is presented in the parenthesis.

Next, the regression analysis is performed for Equation 2. To obtain the unbiased coefficients for the intercept and slope, the regression analysis is conducted with accommodating the serial correlation and heteroscedasticity by using Equations 4 and 5, respectively. The results are summarized in Table 2. In Panel A, the coefficients of intercept, AUD slope and NZD slope with the P-value are presented in columns 1, 2 and 3, respectively. The presence of serial correlation is accommodated by an ARMA (p, q) model, as in column 4, and the Durbin-Watson (DW) test statistic of column 5 indicates that there is no serial correlation in the residual. Similarly, column 6 represents the GARCH (r, s) model used to resolve the issue of heteroscedasticity in the analysis and the P-value for F-statistic in column 7 failed to reject the null hypothesis of no ARCH effect in the residual. In columns 2 and 3, the P-value indicating that AUD slope and NZD slope coefficients are statistically different from 0 at any standard level of significance.

Finally, the joint null hypothesis (H_0: $\alpha_1 + \alpha_2 = 1$) test results are given in Panel B of Table 2. The regression results for the AUD and NZD slope from Panel A are reproduced in Panel B with the standard error under t-test. The high value of R^2 in the last column of Panel B indicates a good fit of the regression line. The t-test reveals that the joint null hypothesis, H_0: $\alpha_1 + \alpha_2 = 1$, cannot be rejected at any standard significance level. To obtain a precise significance level, a Wald test was conducted, and the F-statistic and P-value are presented in columns 5 and 6, respectively. Under the Wald test, the P-value failed to reject the joint null hypothesis, H_0: $\alpha_1 + \alpha_2 = 1$.

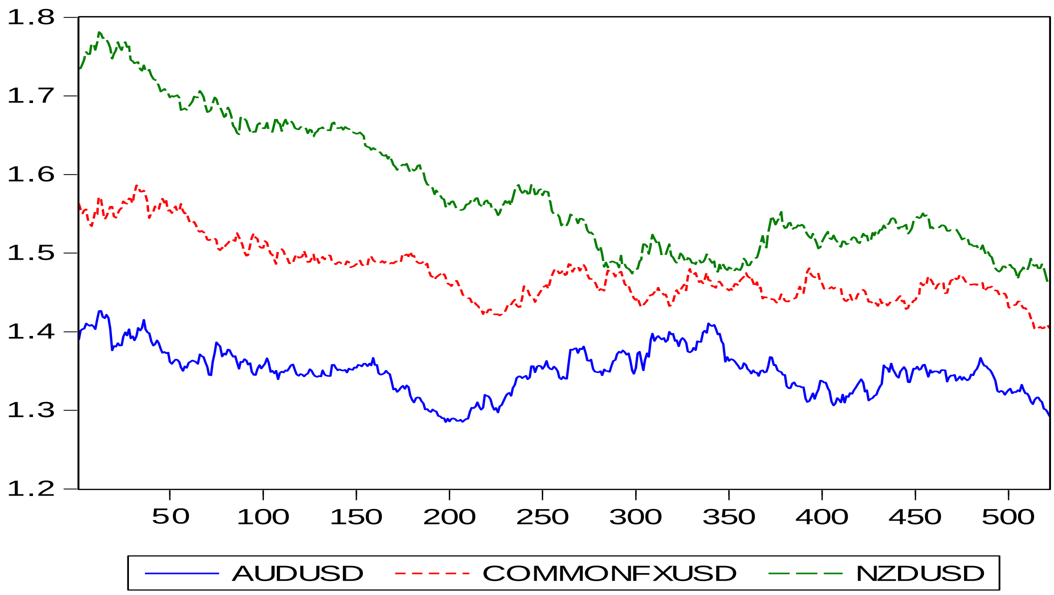
Table 2: Regression Analysis

Panel A						
Intercept (P-value)	AUD Slope (P-value)	NZD Slope (P-value)	Serial Correlation Test		Heteroskedasticity Test	
			ARMA	DW statistic	GARCH	F-statistic (P-value)
1.476898 (0.0000)	0.272131 (0.0000)	0.700963 (0.0000)	(0, 4)	1.821898	(0, 0)	1.941557 (0.1641)
Panel B						
t-test				Wald Test		R^2
AUD Slope		NZD Slope				
Coefficient	Standard error	Coefficient	Standard error	F-statistic	P-value	
0.272131	0.075377	0.700963	0.033202	0.140366	0.7081	0.970336

NOTE: 1.79856 and 1.80582 are lower and upper Critical Values, respectively, for the Durbin-Watson (DW) Test at 1% Significance Level.

The Common Exchange Rate against the U.S. dollar (COMMONFXUSD) from Equation 3 is plotted with the AUD exchange rate (AUDUSD) and NZD exchange rate (NZDUSD) in Figure 1. The COMMONFXUSD, AUDUSD and NZDUSD are shown by dotted, solid and broken lines, respectively. For the sample period, it can be seen that the COMMONFXUSD moves between AUDUSD and NZDUSD, and on average maintains an equal distance from AUDUSD and NZDUSD. It indicates that the AUDUSD and NZDUSD contribute equally to adjusting the inflation, as Equation 1 shows, to obtain COMMONFXUSD.

Figure 1: The Movement of COMMONFXUSD, AUDUSD and NZDUSD for the sample period



4. Conclusion

Economic integration which facilitates free flow of capital and goods drives higher productivity and improved living standards by increasing the size of markets, and thus the extent of competition in global financial and goods market, and the scope they offer for specialization. A large and diverse body of literature finds that market size and specialization are important to economic performance as it contributes to the economic growth. Today, Australia and New Zealand are among the world's most closely integrated economies as the Closer Economic Relations (CER) launched a free trade agreement between them. Australia and New Zealand productivity commissions (2012) flagged the idea of having a single currency. In the discussion paper, the commissions indicated potential benefits from the move such as a single currency Australia and New Zealand should end with their currency instability. Consumers of these two counties would not have to change money when travelling and would encounter less red tape when transferring large sums of money across borders. Similarly, businesses would no longer have to pay hedging costs which they do today in order to insure themselves against the threat of currency fluctuations. However, both Australia and New Zealand would loss of national sovereignty which can be considered as a disadvantage of monetary union.

In this study, we propose the single currency model by adjusting the Australian dollar and New Zealand dollar inflation. The regression analysis is conducted to determine whether (1) the SINCUR has a relation with the one month future AUD and NZD spot rate; (2) one month future AUD and NZD spot rate can jointly explain SINCUR. The regression results suggest that our proposed model is suitable for launching single currency. The Australian productivity commission (2012) stated that the higher levels of integration, such as through a monetary union, also carry their own risks, as demonstrated by the recent European experience (see Hoque 2012). The monetary unification of the Euro is a complex model as it is based on the following five convergence criteria: price stability, sound public finances, sustainable public finances, durability of convergence and Exchange rate stability. It is difficult to maintain these criteria for 13 Euro member countries and subsequently the Euro zones faced recent sovereign debt crises. On the other hand, our simple model accommodates the change of two countries' inflation rates to obtain a single currency. This unique approach can be implemented for the other currencies to become a single currency if they have a close economic relationship.

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